EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with James M. McAleenan and Bhavani Raghuraman on 05/23/08.

The application has been amended as follows:

Claims 1-26, 33-35, 46 and 50-57 are cancelled.

Claims 44, 45, 47-49 are rejoined.

The following claims are amended:

Claim 27. (Currently amended) A method of identifying one or more sets of reagents wherein the one or more sets of reagents is used for determining the pH of a sample, the method comprising:

a. identifying a target pH measurement range of the sample and a target pH accuracy;

b. identifying a plurality of reagents based on known reagent ~~properties such as~~ thermodynamic acid dissociation ~~constant~~ constants and spectral characteristics such that their combination is expected to satisfy the targeted pH range of the sample;

c. identifying one or more spectral channels to make the pH measurement wherein the reagents have elevated optical densities;

d. mixing known relative concentrations of two or more reagents of the plurality of reagents to create one or more sets of reagents;

e. characterizing at least one reagent set of the one or more sets of reagents wherein characterizing includes developing a relationship between optical density ratio and pH based on the thermodynamic acid dissociation constants of the reagents, relative concentrations of the reagents, and one or more spectral channels;

[[d]] f. identifying the spectroscopic noise of a spectral analyzer to be used for the pH measurement;

g. performing an error analysis for at least one reagent set of the one or more sets of reagents wherein the error analysis comprises developing a relationship between standard deviation in pH and spectroscopic noise in optical density based on the relation developed in step (e);

~~e . mixing known relative concentrations of two or more reagents of the plurality of reagents to create the one or more sets of reagents, wherein the one or more sets of reagents is capable of measuring one of the pH at a higher accuracy than each reagent individually for a given pH range or measuring pH over a broader range than the individual reagent for the same accuracy;~~

[[f]] h. optimizing the one or more sets of reagents with an optimization algorithm based on the developed relationship in step (g) to satisfy the target pH accuracy ~~constraint~~ over the ~~targeted~~ target pH measurement range of the sample and determine one of optimum values for relative concentrations or spectral channels or both; and

~~g. repeating steps (e) thru (f) if unable to satisfy target pH measurement range and pH accuracy constraint for the one or more sets of reagents; and~~

[[h]] i. characterizing the one or more optimized reagent set.

Claim 31. (Currently amended) The method of claim 27, ~~wherein~~ further comprising the step of characterizing the at least one of the one or more sets of optimized reagents ~~includes~~ by developing a relationship between optical density ratio and pH using the optimized parameters.

Claim 32. (Currently amended) The method of claim 31, further comprising checking for ~~a unique~~ uniqueness of the correlation between optical density ratio and pH.

Claim 44. (Currently amended) [[A]] The method ~~for determining the pH of formation fluid in a region of earth formation surrounding a borehole~~ of claim 31, wherein the one or more optimized sets of reagents is suitable for use in a downhole environment, the method further comprising:

a. storing [[a]] the optimized set of reagents ~~reagent mixture~~ in a reagent container coupled to a fluids analyzer, wherein said reagent mixture is capable of detecting a pH range broader than each reagent individually;

b. positioning the fluids analyzer downhole;

c. drawing formation fluid into the fluids analyzer;
d. mixing formation fluid with the reagent mixture; and
e. analyzing the optical density of said mixture of formation fluid and reagent mixture in one or more spectral channels to determine the pH of the formation fluid.

Claims 27, 31-32, 43-45, 47-49 and 58-59 are allowed for the following reasons: the prior art submitted by the Applicants and cited by the examiner does not disclose or fairly suggest performing an error analysis for pH measurements based on developed relation between standard deviation in pH and spectroscopic noise in optical density.

New numbering of claims is **1 through 11**.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yelena G. Gakh, Ph.D. whose telephone number is (571) 272-1257. The examiner can normally be reached on 9:30 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Yelena G. Gakh/
Primary Examiner, Art Unit 1797

5/24/2008